



Case report

Avulsion injuries of the male external genitalia & rupture of the diaphragm following road traffic accident

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ABSTRACT

Injury to the male external genitalia and rupture of the diaphragm, are two very uncommon autopsy findings. To the best of our knowledge such a combination of injuries has not been reported in one particular case of autopsy in an English scientific literature. Degloving of the male external genitalia & rupture of the diaphragm may result from motor vehicle accidents, industrial accidents, gunshot & stab injuries. A rare case of traumatic degloving injury of the male external genitalia associated with rupture of the diaphragm & intermingling of thoracic & abdominal viscera is presented here.

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1. Introduction

The male genitalia have a tremendous capacity to resist injury. The flaccidity of the pendulous portion of the penis limits the transfer of kinetic energy during trauma.¹ Protection from damage is also provided by the relative isolation & mobility of the genitalia.² Additionally, the testes are safeguarded by the anatomic tunica albuginea, & the physiologic cremasteric reflex.^{2,3} The laxity of the genital skin usually protects the deep structures from avulsion, so that after car crashes superficial lacerations of the skin are more common.⁴ Lacerations & avulsions of the scrotum not involving the testis may occur because of blunt trauma, machinery accidents, stab wounds & occasional firearm injury. Complete avulsion of the scrotal skin is rare & is usually the result of power take off, auger, or devastating motor vehicle crashes involving widespread skin avulsion & degloving.¹

Diaphragmatic injury is a recognized consequence of high velocity blunt & penetrating trauma to the abdomen & chest rather than from a trivial fall.⁵ Blunt trauma to the abdomen increases the transdiaphragmatic pressure gradient between the abdominal compartment & the thorax.⁶ This causes shearing of a stretched membrane & avulsion of the diaphragm from its points of attachments due to sudden increase in intra-abdominal pressure, transmitted through the viscera.⁷

The objective of the present paper is to highlight an unusual case of degloving lesion of the male external genitalia, rupture of the diaphragm, herniation of the abdominal viscera into the thoracic cavity & tearing of the heart & liver from their respective anatomic attachments, following run over by the tyre of a heavy vehicle.

2. Case report

A 32 year old man was travelling by a cycle to his work place one morning. A lorry coming at high speed hit the cyclist from behind, as a result of which he was thrown to the ground & run over by that vehicle leading to his spot death.

The victim's body was brought to the mortuary wrapped inside a blue polythene bag for the purpose of autopsy, conducted about 6 h after his death. On opening the blue polythene bag, the stomach & intestinal coils were found coming out of the lateral part of the left side of the chest because of a lacerated wound (25 cm × 14 cm) extending from the left subclavicular area downwards involving the fronto-lateral part of the left thoraco-abdominal area (Fig. 1).

A lacerated wound was present in the right inguinal region (14 cm × 8 cm) with exposure of the underlying vessels, nerves, muscles & tendons. There was complete avulsion of the left scrotal skin with exposure of the left testicle. There were multiple avulsions of the penile skin. Apart from this, a grazed abrasion was also noticed on the lower part of right flank of the abdomen (Fig. 2). The left parieto-temporo-occipital part of the skull was fractured

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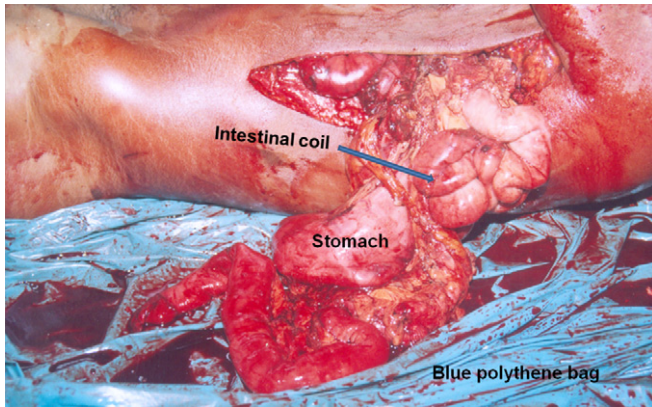


Fig. 1. View after the blue polythene bag was opened.

(9 cm × 4 cm), with the bone found missing. The corresponding part of dura mater was torn & some portion of the brain had escaped out of this bony defect.

On internal examination the following things were observed. There were fractures of the ribs & sternum. The cardiac sac was ruptured. Heart was ruptured, torn from its normal anatomic attachment & was found outside the body inside the polythene bag. All the major blood vessels of the thorax were ruptured. Both the lungs had multiple punctured wounds. Diaphragm was ruptured in the left & middle (11 × 9 cm) & the abdominal viscera had herniated out of this defect into the thoracic cavity (Figs. 3 and 4). Liver was completely torn off from its attachment & found outside the body inside the polythene bag. The cause of death was multiple injuries sustained as a result of run over by the tyre of a heavy vehicle.

3. Discussion

According to Ahmed et al. the commonest cause of injury to male external genitalia was RTA (68%), followed by gunshot (16%) & grinding machine (10.7%). Avulsion of the external genitalia was noticed in 11 out of the 89 cases of RTA. Two individuals had complete penile skin loss, four had partial penile skin loss, three had partial skin loss of scrotum, & two others had avulsion of penis, scrotum & testes.² In a South Korean study by Lee et al. of 156 male patients, with trauma to the external genital organs, assault (33%) was the most common cause.⁸ Shetty et al. reported a case of degloving of penis with partial amputation & absence of both testicles as a result of run over by the rear tyre of a lorry.³ In a case



Fig. 2. Avulsion injury of the male external genitalia.

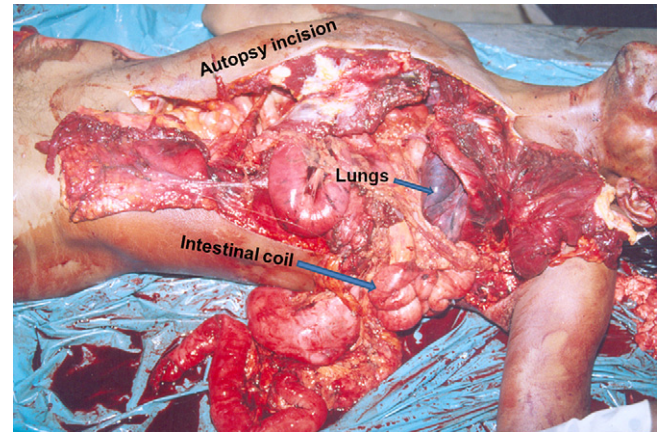


Fig. 3. View after giving the midline autopsy incision.

reported by Paraskevas et al. there was complete degloving of the penile skin & partial avulsion of the scrotal skin with total concomitant revealing of the corpora cavernosa & the corpus spongiosum caused by an agricultural machine.⁹ Selvan et al. reported the case of a person working in a paddy field, when his clothes (dhoti) got entangled in the paddy harvesting machine resulting in complete avulsion & degloving of the penile & scrotal skin with exposure of the testes.¹⁰ Other reported cases of degloving injury of the male external genitalia are elephant stampede,¹¹ fall over a projecting surface,¹² animal bites.¹³ In the past, accidents with power farm machinery were the most common cause of genital injuries in developed countries.¹⁴ Currently, such trauma more commonly results from firearms & accidents involving motorcycles & other vehicles.¹⁵

The incidence of diaphragmatic ruptures after thoraco-abdominal trauma is 0.8–5%.¹⁶ In a study by Matsevych of 12 patients with blunt diaphragmatic rupture (DR), 9 had rupture of the left hemidiaphragm, 2 of the right hemidiaphragm, & 1 had bilateral DR.¹⁷ In a Nigerian study by Adegboye et al. the commonest mechanisms of injury were motor vehicle accidents (48.8%) for blunt & gunshot wounds (56.3%) for penetrating diaphragmatic injuries & the left diaphragm was most commonly involved i.e., 86.9% for blunt & 59.4% for penetration.¹⁸ Sudden increase in the intra-abdominal pressure may cause a diaphragmatic tear & visceral herniation.¹⁹

In the narrated case, the rear impact from the lorry had thrown the person to the ground as a result of which the head must have hit the ground with great force causing the cranio-cerebral injuries

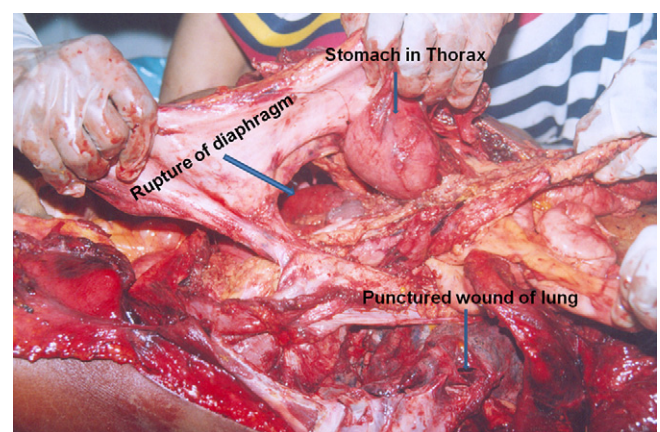


Fig. 4. Herniation of abdominal viscera through diaphragmatic rupture.

mentioned. Furthermore, the run over by the tyres of this heavy vehicle caused all the external & internal injuries as described above. Considering the fact that there was avulsion of the male external genitalia, rupture of diaphragm, herniation of the abdominal viscera into the thoracic cavity, complete detachment of the heart & liver from its attachment in the absence of fracture of the pelvic bone & vertebral column indeed makes it a very rare & unusual case.

From this case, the following conclusions can be drawn, which are also similar with the observations made by some of the previous authors. Injury to the male external genitalia is not a frequent finding & is more commonly associated with road traffic accidents.² In case of blunt DR, the commonest mechanisms of injury were motor vehicle accidents,¹⁸ & the left hemidiaphragm was involved in a high percentage of cases.^{17,18}

Conflict of interest statement

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Ethical approval

None.

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